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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,290	12/04/2003	Gregory S. Clemons	P16912	7054
28062	7590	08/12/2004	EXAMINER	
BUCKLEY, MASCHOFF, TALWALKAR LLC			ANYA, IGWE U	
5 ELM STREET			ART UNIT	
NEW CANAAN, CT 06840			PAPER NUMBER	
			2825	

DATE MAILED: 08/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/728,290

Applicant(s)

CLEMONS ET AL. 

Examiner

Igwe U. Anya

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/4/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 16 – 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Jafari et al. (USPAP 2004/0012934).

3. Jafari et al. teach a system (fig. 5), comprising, an integrated circuit die (130) having a first plurality of conductive contacts, an integrated circuit package (170) comprising a second plurality of conductive contacts, a plurality of interconnect elements (401, 502) in contact with respective ones of the first plurality of conductive contacts and respective ones of the second plurality of conductive contacts, and a double data rate memory (121, 123) electrically coupled to the integrated circuit die;

wherein a first electrical connection is formed between a first one of the first plurality of conductive contacts and a first one of the second plurality of conductive contacts, the first one of the plurality of interconnect elements contacting the first one of the first plurality of conductive contacts and the first one of the second plurality of conductive contacts (fig. 5);

wherein a second electrical connection is formed between a second one of the first plurality of conductive contacts and a second one of the second plurality of conductive contacts, the second one of the plurality of interconnect elements contacting the second one of the first plurality of conductive contacts and the second one of the second plurality of conductive contacts (fig. 5);

wherein at least one of the first plurality of conductive contacts and the second plurality of conductive contacts comprises solder paste (502); and

a motherboard (170, figs. 5, 4) electrically coupled to the integrated circuit die and to the memory.

4. The examiner has not given any patentable weight to the amount of energy used to reflow the solder. The method of forming a device is not germane to the issue of patentability of the device itself.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1 – 5, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US Patent 6451626) in view of Sarkhel (US Patent 6433425).

8. Lin teaches a method comprising, directing a laser to a first interconnect element (138, left on a bilateral symmetry of fig. 1E) made of a solder paste (col. 8 lines 60 - 62), the first interconnect element contacting a first conductive contact (128) of a first device (102) and a second conductive contact (158) of a second device (104), the first interconnect element to form an first electrical connection between the first conductive contact and the second conductive contact based at least in part on the energy (fig. 1E);

directing a laser to a second interconnect element (138, right on a bilateral symmetry of fig. 1E), the second interconnect element contacting a third conductive contact (128) of the first device (102) and a fourth conductive contact (158) of the second device (104), the second interconnect element to form a second electrical connection between the third conductive contact and the fourth conductive contact based at least in part on the energy (col. 10 line 3 – 22); and

joining the first device and the second device to create a combined device, wherein a plurality of interconnect elements are disposed between the first device and the second device, and wherein each of the plurality of interconnect elements is visible from one or more locations external to the combined device (fig. 1F).

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9. Lin lacks the first and second laser having a first and second energy, the first interconnect element comprises a solder ball and a Controlled Collapse Chip Connect (C4) interconnect element, joining the first device and the second device to create a combined device, wherein a plurality of interconnect elements are disposed between the first device and the second device, and wherein each of the plurality of interconnect elements is visible from one or more locations external to the combined device, and a first and second laser energy applied to the interconnect.

10. However, Sarkhel teaches a first interconnect element comprises a solder ball, and (C4) interconnect element (fig. 2), and joining the first device and the second device to create a combined device, wherein a plurality of interconnect elements are disposed between the first device and the second device, and wherein each of the plurality of interconnect elements is visible from one or more locations external to the combined device (fig. 2). Sarkhel teaches a first and second energy applied on the solder interconnects to reflow (col. 4 lines 52 – 67).

11. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the teachings of Sarkhel into the Lin reference to fabricate a C4 interconnect.

12. Claims 6, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US Patent 6451626) in view of Sarkhel (US Patent 6433425), and further in view of Chiu (US Patent 6414849).

13. The Lin/ Sarkhel teaches the features previously outlined, but lacks the first conductive contact and the third conductive contact disposed on an integrated circuit

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die, and the second conductive contact and the fourth conductive contact disposed on an integrated circuit package

14. However, Chiu teaches a first conductive contact and a third conductive contact disposed on an integrated circuit die, and a second conductive contact and a fourth conductive contact disposed on an integrated circuit package (fig. 3).

15. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the teachings of Chiu into the Lin/ Sarkhel reference to fabricate a thin fine-pitch package.

16. Claims 7, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US Patent 6451626) in view of Sarkhel (US Patent 6433425), and further in view of Matsui et al. (US Patent 6662442).

17. The Lin/ Sarkhel teaches the features previously outlined, but lacks the first conductive contact and the third conductive contact disposed on an integrated circuit package, and the second conductive contact and the fourth conductive contact disposed on a package interposer.

18. However, Matsui et al. teach a first conductive contact and a third conductive contact disposed on an integrated circuit package, and a second conductive contact and a fourth conductive contact disposed on a package interposer (fig. 7).

19. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the teachings of Matsui et al. into the Lin/ Sarkhel reference to fabricate an electronic package with a high degree of flatness to ensure good adhesion.

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20. Prior art considered, but not used in the rejection include Fujimoto et al. (US Patent 5829125), Hawke et al. (US Patent 6133626), Plepys et al. (US Patent 6140707), Sylvester et al. (US 2004/0012938), and Hayashi (JP Patent 2002016214).

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Igwe U. Anya whose telephone number is (571) 272-1887. The examiner can normally be reached on M - F 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Igwe U. Anya
Examiner
Art Unit 2825

IA

August 1, 2004



MATTHEW SMITH
SUPERVISORY PATENT EXAMINER
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